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PATENT TRADEMARK OFFICE

Patent
Case No.: 57764US005

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor: STEPHEN C. P. JOSEPH
Application No.: Unknown Group Art Unit: Unknown
Filed: Herewith Examiner: Unknown
Title: SPRAYGUN WITH BUILT-IN QUICK FIT CONNECTOR

CLAIM OF PRIORITY

Commissioner for Patents
P.O. Box 1450
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Dear Sir:

Pursuant to Title 35, United States Code, Section 119, priority is hereby claimed based upon the earlier filed foreign application GB 0224698.1 filed on October 24, 2002, GB 0305614.0 filed on March 12, 2003, and GB 0311014.5, filed on May 14, 2003, in the United Kingdom.

A certified copy of the above-identified, earlier-filed foreign applications are enclosed.

Respectfully submitted,

October 29, 2003

Date

By: 

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Office of Intellectual Property Counsel
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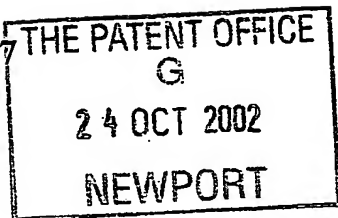
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24 OCT 2002 1758124-5 002806
P01/7700 0.00/0224698.1

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1.	Your reference	JL3219/DAW		
2.	Patent application number (The Patent Office will fill in this part)	0224698.1		
		24 OCT 2002		
3.	Full name, address and postcode of the or of each applicant (underline all surnames)	3M Innovative Properties Company P.O. Box 33427 St. Paul, MN 55133-3427 U.S.A. <i>76.64097003</i> Patents ADP number (if you know it) If the applicant is a corporate body, give the country/state of its incorporation		
		DELAWARE, USA		
4.	Title of the invention	EASY CLEAN SPRAY GUN		
5.	Name of your agent (if you have one)	Barker Brettell		
		"Address for service" in the United Kingdom to which all correspondence should be sent (including the postcode) 138 Hagley Road Edgbaston Birmingham B16 9PW Patents ADP number (if you know it) 7442494002		
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11. I/We request the grant of a patent on the basis of this application.

Signature

Date

Barker Brettell

23 October 2002

12. Name and daytime telephone number of person to contact in the United Kingdom

Mr D A Wightman

Tel: 0121 456 1364

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DUPLICATE

SPRAYGUN WITH BUILT-IN QUICK-FIT CONNECTOR

Field of the Invention

5 This invention concerns improvements in or relating to liquid spraying apparatus such as a spray gun. More especially, the invention relates to the connection between the spray gun and a reservoir containing the liquid to be sprayed. The invention has particular application to a releasable connection for detachably mounting the reservoir on the spray gun and to
10 a spray gun adapted for such connection.

Background of the invention

Spray guns are widely used in vehicle body repair shops when re-spraying
15 a vehicle that has been repaired following an accident. In the known spray guns, the liquid is contained in a reservoir attached to the gun from where it is fed to a spray nozzle. On emerging from the spray nozzle, the liquid is atomised and forms a spray with compressed air supplied to the nozzle. The liquid may be gravity fed or suction fed or, more recently,
20 pressure fed by an air bleed line to the reservoir from the compressed air line to the spray gun.

Traditionally, the liquid is contained in a rigid pot mounted on the spray gun by engagement of complementary screw threads on the pot and gun.
25 In this way, the pot can be removed for cleaning or replacement. Typically, the pot is secured to the gun empty and has a removable lid by means of which the liquid can be added to the pot while attached to the gun. On completion of spraying, the pot can be removed and the gun and pot cleaned for re-use.

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With this arrangement, the threads on the gun and pot may be damaged by mis-use, for example if an attempt is made to secure a pot having a non-matching thread. Also, on completion of spraying, careful cleaning is required to remove all traces of liquid from the threads to prevent the
5 threads becoming blocked, for example with dried paint, and to prevent cross-contamination with the liquid next sprayed.

Damaged or blocked threads may render the gun unusable requiring the purchase of a new gun. This adds to costs and is inconvenient if time is
10 lost because a spare gun is not to hand to continue spraying. Moreover, cleaning of the threads usually requires solvents that are also used to clean the gun and pot. The use of solvents is undesirable from health and safety considerations and causes problems for disposal of the solvent after use.

15 We have recently developed a system in which the reservoir is disposable after use thereby reducing the amount of cleaning required on completion of spraying. With this system, the reservoir may be filled with the liquid to be sprayed before attaching to the gun. The traditional screw threaded
20 connection requires the reservoir to be rotated several times, typically at least four or five turns, to engage fully the threads and secure the reservoir in a fluid tight manner. This is time consuming and requires considerable care and dexterity on the part of the user to prevent spillage when the reservoir is full of liquid.

25 In order to reduce these problems we have proposed a system for connecting the reservoir to the spray gun via an adaptor that is screwed into the spray gun and provides a releasable quick-fit connection to the reservoir. For example, the reservoir and adaptor may be provided with
30 bayonet type formations that are engageable with a push-twist action

requiring less than one complete turn of the reservoir to connect the reservoir to the gun.

5 This arrangement enables the reservoir to be attached to and detached from the gun in a simple, efficient manner that reduces the risk of spillage when the reservoir contains liquid and that requires less dexterity on the part of the user.

10 The provision of the adaptor enables existing guns having a screw thread connection for use with a conventional rigid pot to be converted for use with our system using a disposable reservoir. This has numerous advantages for the user, in particular from the reduced amount of cleaning required on completion of spraying. However, problems can arise if an adaptor having a thread matching the thread on the gun is not
15 to hand, for example if the adaptor is removed for cleaning and lost. The gun cannot then be used with the disposable reservoir and working time may be lost if the user does not have a spare adaptor or a rigid pot that can be screwed into the spray gun without the adaptor. Also, the screw threaded connection between the gun and adaptor is susceptible to damage
20 from mis-use in the same way as the connection between the gun and pot that may result in the gun being unusable.

Summary of the Invention

25 The present invention has been made from a consideration of the foregoing problems and disadvantages of the existing methods for securing a reservoir to a spray gun.

30 More particularly, embodiments of the present invention provide an improved connection between a spray gun and reservoir that enables the

reservoir to be attached to and detached from the gun in a simple manner that reduces the risk of damage to the gun.

Furthermore, at least one embodiment of the present invention provides
5 such improved connection between the gun and reservoir that allows the reservoir to be attached directly to the gun without additional separate components that may be lost and/or may not match the connections on the gun and reservoir.

10 Moreover, at least one embodiment of the present invention provides a spray gun adapted for rapid, releasable connection to a reservoir that enables the reservoir to be connected when filled with liquid with less risk of spillage and does not require a high degree of dexterity on the part of the user to connect/disconnect the reservoir.

15 Thus, according to one aspect of the present invention, there is provided liquid spraying apparatus comprising a spray gun and a reservoir for a liquid to be sprayed, the reservoir having an outlet connectable to the spray gun to permit the liquid to be withdrawn from the reservoir in use,
20 and the spray gun having integral connector means arranged for non-threaded engagement with co-operating connector means on the reservoir by means of which the reservoir is releasably secured to the spray gun.

As used herein, the term "liquid" refers to all forms of flowable materials
25 that can be applied using a spray gun (whether or not they are intended to colour the surface) including (without limitation) paints, primers, base coats, lacquers, varnishes and similar paint-like materials as well as other materials such as adhesives, sealers, fillers, putties, powder coatings, blasting powders, abrasive slurries, mould release agents and foundry
30 dressings which may be applied in atomised or non-atomised form

depending on the properties and/or the intended application of the material and the term "liquid" is to be construed accordingly.

By this invention, the spray gun is provided with an integral non-threaded connector for mating engagement with a co-operating non-threaded connector on the reservoir. In this way, the afore-mentioned problems and disadvantages of a screw-threaded connection between the reservoir and spray gun are avoided and the reservoir can be releasably secured to the spray gun in a simple manner that facilitates rapid connection/disconnection of the reservoir.

In a preferred arrangement, the spray gun has an integral socket adapted to receive a connector tube integral with the reservoir. The socket provides a through bore leading to an inlet of the spray gun and the outlet from the reservoir opens to the connector tube. In this way, the outlet of the reservoir is connected to the inlet of the spray gun for delivering liquid to the spray gun when the connector tube is received in the socket in use.

The socket may be recessed in the body of the spray gun. More preferably, however, the socket is provided in a connector boss arranged to project from the body of the spray gun. In this way, the socket is clear of the body of the spray gun providing improved access for connection of the reservoir.

The connector boss may be formed integrally with the body of the spray gun. For example, the body and boss may be a casting of metal or alloy. Alternatively, the connector boss may be formed separately from the body of the spray gun and permanently secured thereto. For example, the connector boss may be welded to the body of the spray gun.

The reservoir and spray gun may be provided with mateable formations providing a push-fit connection of the reservoir to the spray gun. For example, the connector tube and socket may be tapered so that the
5 connector tube is an interference friction fit in the socket to retain the reservoir on the spray gun.

Alternatively, the reservoir and spray gun may be provided with mateable formations engageable with a push-twist action that requires less than one
10 complete turn of the reservoir relative to the spray gun.

In one arrangement, the connector tube and socket are provided with bayonet type formations engageable within the bore of the socket. For example, the connector tube may be provided with one or more outwardly
15 extending bayonet lugs or ears co-operable with one or more bayonet grooves in the wall of the bore of the socket. The or each bayonet groove may have an axially extending guide portion to receive the aligned lug or ear leading to a circumferentially extending retention portion to trap and retain the lug or ear to secure the reservoir to the spray gun.

20

In another arrangement, the spray gun and reservoir are provided with mateable formations engageable externally of the bore of the socket. For example, the reservoir may be provided with one or more hook members separate from the connector tube and arranged to engage the spray gun.

25

In a preferred arrangement, the or each hook member is locatable over a surface of an external flange of the connector boss. For example, the flange may have a recess arranged to pass the distal end of the aligned hook member, and an adjacent cam lobe arranged to deflect resiliently the
30 hook member on rotation of the reservoir to cause the distal end of the

hook member to locate over the surface of the flange to retain the reservoir on the spray gun.

5 The reservoir may be re-usable. For example, the reservoir may comprise a rigid pot that is removed from the spray gun and cleaned on completion of spraying. More preferably, however, the reservoir comprises a collapsible container for the paint that can be removed and thrown away after use.

10 According to another aspect of the present invention, there is provided a spray gun having an integral non-threaded connector for mating engagement with a non-threaded connector on a reservoir to connect releasably the reservoir to the spray gun.

15 The non-threaded connector on the spray gun may be provided by a socket having an internal bore providing an inlet connectable to the outlet of the reservoir. The outlet of the reservoir may be provided by a connector tube received in the bore of the socket on the gun. The socket may be recessed in the body of the spray gun but more preferably the
20 socket is provided by a connector boss that projects from the body of the spray gun. The connectors may be engageable within the bore of the socket to connect releasably the reservoir to the gun. Alternatively, the connectors may be engageable externally of the bore of the socket to connect releasably the reservoir to the gun.

25 According to yet another aspect of the present invention, there is provided a method of attaching a reservoir to a spray gun comprising providing a body of the spray gun with an integral non-threaded connector, providing the reservoir with a non-threaded connector

mateable with the connector of the body, and connecting the connectors to secure releasably the reservoir to the spray gun.

5 Preferably, the connectors are engageable with a push-twist action requiring less than one complete turn of the reservoir to secure the reservoir to the spray gun. For example, the connectors may be of the bayonet type.

10 Other features, benefits and advantages of the invention will be apparent from the following detailed description of exemplary embodiments of the invention with reference to the accompanying drawings.

Brief description of the drawings

15 **Figure 1** is a perspective view of liquid spraying apparatus embodying the present invention;

Figure 2 is a perspective view of the reservoir shown in Figure 1 separate from the spray gun;

20

Figure 3 is a longitudinal section through the reservoir shown in Figure 2;

25 **Figure 4** is a perspective view of the spray gun shown in Figure 1 separate from the reservoir;

Figure 5 is an exploded perspective view showing a detail of the connection between the spray gun and reservoir shown in Figures 1 to 4;

Figure 6 is an end view of the connector boss of the spray gun with parts removed for clarity;

Figure 7 is an exploded perspective view of an alternative connection
5 between a spray gun and reservoir embodying the present invention;

Figure 8 is a section through the assembled connection of Figure 7;

Figure 9 is an exploded perspective view of another connection between a
10 spray gun and reservoir embodying the present invention; and

Figure 10 is a section through the assembled connection of Figure 9.

Detailed Description of the Exemplary Embodiments

15

Referring first to Figure 1 of the accompanying drawings, there is shown liquid spraying apparatus embodying the present invention comprising a spray gun 1 and a reservoir 2 releasably connected to the spray gun 1.

20 The gun 1 comprises a body 3, a handle 4 which extends downwards from the rear end of the body, and a spray nozzle 5 at the front end of the body. The gun 1 is manually-operated by a trigger 6 which is pivotally-mounted on the sides of the gun.

25 The reservoir 2, which contains paint (or similar material) to be discharged by the gun, is located on the top of the body 3 and communicates with an internal passageway (not visible) which extends through the gun to the nozzle 5.

In use, the gun 1 is connected via a connector 7 at the lower end of the handle 3 to a source of compressed air (not shown) so that, when the user pulls on the trigger 6, compressed air is delivered through the gun to the nozzle 5. As a result, paint delivered under gravity from the reservoir 2 to the nozzle 5 is atomised on leaving the nozzle 5 and forms a spray with the compressed air emerging from the nozzle 5.

Referring now to Figures 2 and 3 of the drawings, the reservoir 2 includes an outer container 8, a disposable liner 9, a disposable lid 10 and a collar 11. The liner 9 corresponds in shape to (and is a close fit in) the interior of the container 8 and has a narrow rim 12 at the open end which sits on the top edge of the container 8.

The lid 10 is of conical shape and has a dependent skirt 13 inset from the peripheral edge. The skirt 13 is a push-fit in the open end of the liner 9 to locate the peripheral edge of the lid 10 over the rim 12 of the liner 9. The lid/liner assembly is secured in place by the annular collar 11 that screws onto the container 8 on top of the lid 10.

The lid 10 has a central aperture 14 at the apex that leads to a connector tube 15 providing a fluid outlet and a pair of hook member 16, 17 located either side of the connector tube 15. The hook members 16, 17 are arranged to secure releasably the reservoir 2 to the spray gun 1 and the tube 15 is formed with external annular ribs 18 to provide a fluid-tight seal with the spray gun 1 as described later.

A mesh filter 19 is a push-fit within the skirt 13 and removes particulate material from the paint delivered through the tube 15 to the spray gun 1 in use. Alternatively, the filter 19 may be a push-fit in the tube 15 or may be an integral part of the lid 10.

With reference now to Figures 4 to 6, the spray gun 1 is provided with an integral connector boss 20 on top of the body 3. The boss 20 extends upwardly from the body 3 and has a socket 21 shaped to receive the connector tube 15 on the lid 10 of the reservoir 2. The socket 21 terminates at an internal shoulder 33 leading to a bore 34 that extends away from the socket 21 and provides an inlet for delivery of paint from the reservoir 2 to the spray gun 1.

In this embodiment, the boss 20 is formed integrally with the body 3 of the gun 1, for example, the body 3 may be a casting of lightweight metal or alloy. Alternatively, the boss 20 may be formed separately and permanently secured to the body 3, for example by welding so as to form an integral part of the gun 1.

The external ribs 18 of the connector tube 15 provide a fluid-tight seal with the socket 21 and the boss 20 has an external flange 22 at the distal end for co-operating with the hook members 16, 17 to secure releasably the reservoir 2 to the spray gun 1. In an alternative arrangement (not shown), a fluid-tight seal may be obtained by one or more sealing rings, eg O-rings, located in groove(s) on the connector tube 15 or in the wall of the socket 21.

The flange 22 comprises four arcuate recesses 23, 24, 25, 26 (Figure 6) uniformly spaced in a circumferential direction around the periphery such that the recesses 23, 25 are opposite each other and the recesses 24, 26 are opposite each other.

Each recess 23, 24, 25, 26 leads in a clockwise direction (as viewed in Figure 6) via a cam lobe 23a, 24a, 25a, 26a at the end of the recess 23,

24, 25, 26 to a flat 27, 28, 29, 30 that terminates in an abutment 27a, 28a, 29a, 30a.

Each hook member 16, 17 comprises an enlarged head 31, 32 at the distal
5 end having a chamfer face 31a, 32a leading to an undercut locking rib 31b, 32b for co-operating with the flange 22.

To secure the reservoir 2 to the spray gun 1, the hook members 16, 17
are aligned with a pair of opposed recesses 23, 25 or 24, 26 in the flange
10 22. The connector tube 15 is then pushed into the socket 21 so that the enlarged heads 31, 32 of the hook members 16, 17 pass through the aligned recesses 23, 25 or 24, 26.

The reservoir 2 is then rotated relative to the spray gun 1 to cause the
15 hook members 16, 17 ride over the cam lobes 23a, 25a or 24a, 26a and locate the locking ribs 31b, 32b behind the flats 27, 29 or 28, 30. In this way, the reservoir 2 is secured to the spray gun 1.

The reservoir 2 can be removed from the spray gun 1 by a reverse
20 operation in which the reservoir 2 is first rotated to align the enlarged heads 31, 32 of the hook members 16, 17 with the opposed recesses 23, 25 or 24, 26. The reservoir 2 is then pulled to withdraw the connector tube 15 from the socket 21.

25 The hook members 16, 17 are deflected outwardly by engagement with the cam lobes 23a, 25a or 24a, 26a and snap back on passing the cam lobes when rotating the reservoir 2 relative to the spray gun 1 both to attach and detach the reservoir 2. In this way, when attached to the spray
gun 1, the reservoir 2 is positively retained in position when the spray
30 gun 1 is being manoeuvred to apply paint to a surface.

The reservoir 2 can also be fitted to the spray gun 1 by a simple push fit by first aligning the hook members 16, 17 with a pair of opposed flats 27, 29 or 28, 30 of the flange 22. The reservoir 2 is then pushed towards the spray gun 1 to cause the chamfer faces 31a, 32a to engage the flange 22. The enlarged heads 31, 32 are deflected outwardly due to the resilience of the hook members 16, 17 to ride over the flange 22 and snap back after passing the flange 22 to locate the locking ribs 31b, 32b behind the flats 27, 29 or 28, 30. In this way, the reservoir 2 is secured to the spray gun 1. It may be possible to remove the reservoir 2 by a reverse operation if sufficient force is applied to release the locking ribs 31b, 32b.

In use, the reservoir 2 is filled with paint (or other liquid to be sprayed) prior to mounting on the spray gun 1. For this, the liner 9 is pushed inside the container 8. Paint is then put into the liner 9 and, if necessary, mixed with other tinters, hardeners and thinners (solvents). The lid 10 is then pushed into place and the collar 11 is screwed down tightly to hold the lid 10 in position.

20

The spray gun 1 is then inverted from its normal operating position illustrated in Figure 1 so that the reservoir 2 can be presented to the spray gun 1 in an upright position to prevent spillage of paint. The reservoir 2 is then secured to the spray gun 1 by a push-twist or push action as described above.

25

The spray gun 1 can then be returned to its normal operating position for use in the usual way. As paint is withdrawn from the reservoir, the liner 9 collapses in an axial direction from base end 9a towards the lid 10. A vent hole 8a in the base end of the container 8 allows air to enter the

30

container 8 as the liner 9 collapses. Sidewall 9b of the liner 9 folds inwardly in a random, uncontrolled manner as the liner 9 collapses.

5 After use, when the spray gun 1 is to be cleaned, the spray gun 1 can be re-inverted from its operating position shown in Figure 1. The airline is disconnected and the trigger 6 actuated briefly to allow paint within the spray gun 1 to drain back into the liner 9 in the reservoir 2. The reservoir 2 is then removed from the spray gun 1 as described above.

10 As will be appreciated, the integral formations on the gun 1 and reservoir 2 enable the reservoir 2 to be attached to and detached from the gun 1 by a simple action. In this way, the apparatus can be rapidly and easily assembled and disassembled with minimum manual dexterity on the part of the user. Also the risk of spillage when connecting the reservoir 2
15 containing paint to the gun 1 is reduced. Furthermore, the reservoir 2 can be detachably secured to the gun 1 without a separate adaptor and without engagement of screw threads that can be damaged by mis-use or become blocked by deposits of paint so as to render the gun 1 unusable.

20 The reservoir 2 can be disassembled when disconnected from the spray gun 1 by removing the collar 11 and pulling out the lid 10 bringing with it the collapsed liner 9. Any paint remaining in the liner 9 may be stored for a short period of time by sealing the connector tube 15, for example with a detachable closure cap (not shown). The lid/liner assembly can
25 then be re-assembled with the container 8 and collar 11 and re-attached to the spray gun 1 to use the remaining paint.

When removed from the container 8, the lid/liner assembly is relatively fragile and susceptible to separation of the liner 9 and lid 10 if
30 mishandled. Accordingly, it is generally only practical to store unused

paint for a few hours and any unused paint must be decanted into another container if long term storage is required.

When all the paint has been used or if any remaining paint is no longer
5 required, the lid 10 (including the filter 19) and collapsed liner 9 can be discarded leaving the container 8 and collar 11 clean and ready for re-use with a fresh liner 9 and lid 10. In this way, only the spray gun 1 itself needs to be cleaned. As a result, a reduction in the amount of solvent used for cleaning may be achieved.

10

Referring now to Figures 7 and 8, there is shown another arrangement for releasably securing the reservoir to the spray gun. For convenience, like reference numerals in the series 100 are used to indicate parts corresponding to the previous embodiment.

15

In this embodiment, the hook members of the previous embodiment are omitted and the reservoir 102 is releasably secured to the spray gun 1 by an interference friction fit between the connector tube 115 of the reservoir 102 and the socket 121 of the spray gun 101.

20

As shown, the connector tube 115 on the lid 110 of the reservoir 102 is of conical shape tapered towards the distal end and the socket 121 of the connector boss 120 is of conical tapered shape for an interference friction fit of the tube 115 in the socket 121. In this way, the reservoir 102 is
25 secured to the gun 101 by push-fit.

The interference friction fit of the tube 115 provides a fluid-tight seal with the socket 121. If desired, one or more sealing rings (not shown) may be located in groove(s) in the tube 115 or socket 121 to enhance the

seal therebetween. The or each sealing ring is compressed by push-fit of the tube 115 that also assists retention of the tube 115 in the socket 121.

5 In other respects, the construction of the reservoir 102 is generally similar to the previous embodiments and will be understood from the description thereof without further explanation.

Referring now to Figures 9 and 10, there is shown yet another arrangement for releasably securing the reservoir to the spray gun. For
10 convenience, like reference numerals in the series 200 are used to indicate parts corresponding to the previous embodiments.

In this embodiment, the hook members of the embodiment of Figures 1 to 6 are omitted and the reservoir is releasably secured to the spray gun
15 201 by co-operating bayonet formations on the connector tube 215 of the reservoir and the socket 221 of the spray gun 201.

As shown, the connector tube 215 is provided at its distal end with opposed outward extending lugs 250 forming one part of a bayonet
20 connection. The connector boss 220 of the spray gun 201 is formed internally with the other part of the bayonet connection. More particularly, the internal wall of the socket 221 is formed with opposed inwardly facing grooves 251 extending axially from the outer free end of the boss 220 and terminating at internal shoulder 233 in a circumferential
25 groove 252.

In this way, the reservoir is secured to the spray gun 201 by aligning the lugs 250 with the axial grooves 251 and pushing the connector tube 215 into the socket 221 until the distal end of the tube 215 contacts the
30 shoulder 233. The reservoir is then rotated to locate the lugs 250 in the

circumferential groove 252. In this way, the reservoir is retained by the lugs 250. The reservoir can be detached from the spray gun 201 by a reverse operation.

- 5 In other respects, the construction of the reservoir is generally similar to the previous embodiments and will be understood from the description thereof without further explanation.

10 The above-described embodiments illustrate the manner in which the present invention provides a quick-fit connection to secure releasably the reservoir to the spray gun by connector means integral with the spray gun that avoids the use of screw threads.

15 The quick-fit connection also allows the reservoir to be releasably secured to the spray gun when containing paint by a simple push-twist action requiring less than one complete rotation of the reservoir that reduces the risk of spillage.

20 It will be appreciated that the exemplary embodiments described herein are intended to illustrate the diverse range and application of the invention and that features of the embodiments may be employed separately or in combination with any other features of the same or different embodiments.

25 Moreover, while the exemplary embodiments described and illustrated are believed to represent the best means currently known to the applicant, it will be understood that the invention is not limited thereto and that various modifications and improvements can be made within the spirit and scope of the invention as generally described herein.

For example, the socket may be recessed in the body of the gun and adapted to receive the connector tube of the reservoir. The reservoir and spray gun may be provided with any suitable inter-engageable formations for releasably securing the reservoir to the spray gun without employing screw threads.

The reservoir may be of any constructions for containing paint to be delivered to the spray gun. For example, the reservoir may contain the paint in a collapsible container that is thrown away on completion of spraying as described. Alternatively, the reservoir may contain the paint in a re-usable paint pot that is cleaned on completion of spraying.

The reservoir may be constructed to permit paint to be added to the reservoir while attached to the spray gun. In this way, the reservoir may be re-filled without detaching the reservoir from the spray gun to allow spraying of areas requiring a larger volume of paint than the reservoir can hold. As a result, the reservoir can be of a compact size and shape that facilitates handling the spray gun. In particular, the balance, stability and manoeuvrability of the spray gun may be enhanced by employing a re-fillable reservoir of low volume.

The reservoir may be pre-filled with the paint to be sprayed. Alternatively, the reservoir may be supplied empty and filled by the end user. Pre-filling may be advantageous for spraying paints of standard colours that do not require special matching of the colour, for example primers, base coats etc.

The invention provides spray guns and reservoirs with integral co-operating formations that are mateable without screw threads. However, we may provide an adaptor plug for converting an existing paint pot

having a screw threaded connector boss for use with the spray gun. Such plug may be screwed onto the connector boss of the paint pot and provided with formations for engagement with the non-threaded formations on the body of the spray gun. In this way, existing paint pots
5 with a threaded connector boss can be used with the spray gun of the present invention.

The spray gun may be of the gravity feed type described herein. Alternatively, the spray gun may be of the suction feed type or pressure
10 feed type. The pressure feed type may employ a bleed line from the compressed air supply to the gun to assist delivery of the paint from the reservoir to the spray gun. The invention may also apply to other types and constructions of spray guns for spraying liquids as defined herein.

15 Other modifications and improvements will be apparent to those skilled in the art and are deemed within the scope of the invention.

CLAIMS

1. Liquid spraying apparatus comprising a spray gun and a reservoir for a liquid to be sprayed, the reservoir having an outlet connectable to the spray gun to permit the liquid to be withdrawn from the reservoir in use, and the spray gun having integral connector means arranged for non-threaded engagement with co-operating connector means on the reservoir by means of which the reservoir is releasably secured to the spray gun.
2. Apparatus according to claim 1 wherein, the spray gun has an integral socket adapted to receive a connector tube integral with the reservoir.
3. Apparatus according to claim 2 wherein, the socket provides a through bore leading to an inlet of the spray gun and the outlet from the reservoir opens to the connector tube.
4. Apparatus according to claim 2 or claim 3 wherein, the socket is recessed in the body of the spray gun.
5. Apparatus according to claim 2 or claim 3 wherein, the socket is provided in a connector boss arranged to project from the body of the spray gun.
6. Apparatus according to claim 5 wherein, the connector boss is formed integrally with the body of the spray gun.
7. Apparatus according to claim 6, wherein the body and boss comprise a casting of metal or alloy.

8. Apparatus according to claim 5 wherein, the connector boss is formed separately from the body of the spray gun and permanently secured thereto.

5 9. Apparatus according to claim 8 wherein, the connector boss is welded to the body of the spray gun.

10. Apparatus according to any one of the preceding claims wherein, the reservoir and spray gun are provided with mateable formations
10 providing a push-fit connection of the reservoir to the spray gun.

11. Apparatus according to claim 10 as dependent on claim 2 wherein, the connector tube and socket are tapered so that the connector tube is an interference friction fit in the socket to retain the reservoir on the spray
15 gun.

12. Apparatus according to any one of claims 1 to 9 wherein, the reservoir and spray gun are provided with mateable formations engageable with a push-twist action that requires less than one complete
20 turn of the reservoir relative to the spray gun.

13. Apparatus according to claim 12 as dependent on claim 2 wherein, the connector tube and socket are provided with bayonet type formations engageable within the socket.

25

14. Apparatus according to claim 13 wherein, the connector tube is provided with one or more outwardly extending bayonet lugs or ears co-operable with one or more bayonet grooves in a wall of the socket.

15. Apparatus according to claim 14 wherein, the or each bayonet groove has an axially extending guide portion to receive the aligned lug or ear leading to a circumferentially extending retention portion to trap and retain the lug or ear to secure the reservoir to the spray gun.

5

16. Apparatus according to any one of claims 2 to 9 wherein, the spray gun and reservoir are provided with mateable formations engageable externally of the socket.

10 17. Apparatus according to claim 16 wherein, the reservoir is provided with one or more hook members separate from the connector tube and arranged to engage the spray gun.

15 18. Apparatus according to claim 17 as dependent on claim 5 wherein, the or each hook member is locatable over a surface of an external flange of the connector boss to secure the reservoir to the spray gun.

20 19. Apparatus according to claim 18 wherein, the flange has a recess arranged to pass a distal end of the aligned hook member, and an adjacent cam lobe arranged to deflect resiliently the hook member on rotation of the reservoir to cause the distal end of the hook member to locate over the surface of the flange to retain the reservoir on the spray gun.

25 20. Apparatus according to any one of the preceding claims wherein, the reservoir is re-usable.

21. Apparatus according to claim 20 wherein, the reservoir comprises a rigid pot that is removed from the spray gun and cleaned on completion of spraying.

30

22. Apparatus according to any one of claims 1 to 19 wherein, the reservoir comprises a collapsible container for the paint that can be removed and thrown away after use.

5 23. A spray gun having an integral non-threaded connector for mating engagement with a non-threaded connector on a reservoir to connect releasably the reservoir to the spray gun.

10 24. A spray gun according to claim 23 wherein, the non-threaded connector on the spray gun is provided by a socket having an internal bore providing an inlet connectable to an outlet of the reservoir.

15 25. A spray gun according to claim 24 wherein, the outlet of the reservoir is provided by a connector tube received in the bore of the socket on the gun.

26. A spray gun according to claim 25 wherein, the socket is recessed in the body of the spray gun.

20 27. A spray gun according to claim 25 wherein, the socket is provided by a connector boss that projects from the body of the spray gun.

25 28. A spray gun according to any one of claims 24 to 27 wherein, the connectors are engageable within the bore of the socket to connect releasably the reservoir to the gun.

29. A spray gun according to any one of claims 24 to 27 wherein, the connectors are engageable externally of the bore of the socket to connect releasably the reservoir to the gun.

30. A method of attaching a reservoir to a spray gun comprising providing a body of the spray gun with an integral non-threaded connector, providing the reservoir with a non-threaded connector mateable with the connector of the body, and connecting the connectors to
5 secure releasably the reservoir to the spray gun.

31. A method according to claim 30 wherein, the connectors are engageable with a push-twist action requiring less than one complete turn of the reservoir to secure the reservoir to the spray gun.

10

32. A method according to claim 31 wherein, the connectors are of the bayonet type.

33. Liquid spraying apparatus substantially as hereinbefore described
15 with reference to Figures 1 to 6 of the accompanying drawings.

34. Liquid spraying apparatus substantially as hereinbefore described with reference to Figures 1 to 6 of the accompanying drawings as modified by Figures 7 and 8 of the accompanying drawings.

20

35. Liquid spraying apparatus substantially as hereinbefore described with reference to Figures 1 to 6 of the accompanying drawings as modified by Figures 9 and 10 of the accompanying drawings.

25 36. A method of attaching a reservoir to a spray gun substantially as hereinbefore described with reference to Figures 1 to 6 of the accompanying drawings.

30 37. A method of attaching a reservoir to a spray gun substantially as hereinbefore described with reference to Figures 1 to 6 of the

accompanying drawings as modified by Figures 7 and 8 of the accompanying drawings.

38. A method of attaching a reservoir to a spray gun substantially as
5 hereinbefore described with reference to Figures 1 to 6 of the accompanying drawings as modified by Figures 9 and 10 of the accompanying drawings.

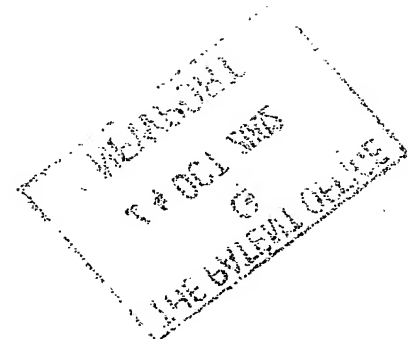
ABSTRACT

SPRAYGUN WITH BUILT-IN QUICK-FIT CONNECTOR

A spray gun 1 and a detachable liquid reservoir 2 releasably attached to
5 the spray gun 1 by engagement of mateable, non-threaded formations
provided on the spray gun 1 and the reservoir 2. The spray gun 1 has an
integral connector boss 20 with a socket 21 for reception of a connector
tube 15 of the reservoir 2. The boss 20 has an external flange 22 at the
10 distal end and the reservoir 2 has hook members 16,17 separate from the
connector tube 15. The hook members 16,17 are co-operable with the
flange 22 when the connector tube 15 is received in the socket 21 to
secure releasably the reservoir 2 to the spray gun 1 (Figures 1 to 6). In
another arrangement (Figures 7 and 8), the connector tube 115 is an
15 interference friction-fit in the socket 121 to secure releasably the
reservoir 102 to the spray gun 101. In yet another arrangement (Figures
9 and 10), the connector tube 215 has bayonet lugs 250 co-operable with
bayonet grooves 251,253 in the wall of the socket 221 when the connector
tube 215 is received in the socket 221 to secure releasably the reservoir to
the spray gun 201.

20

Figure 5



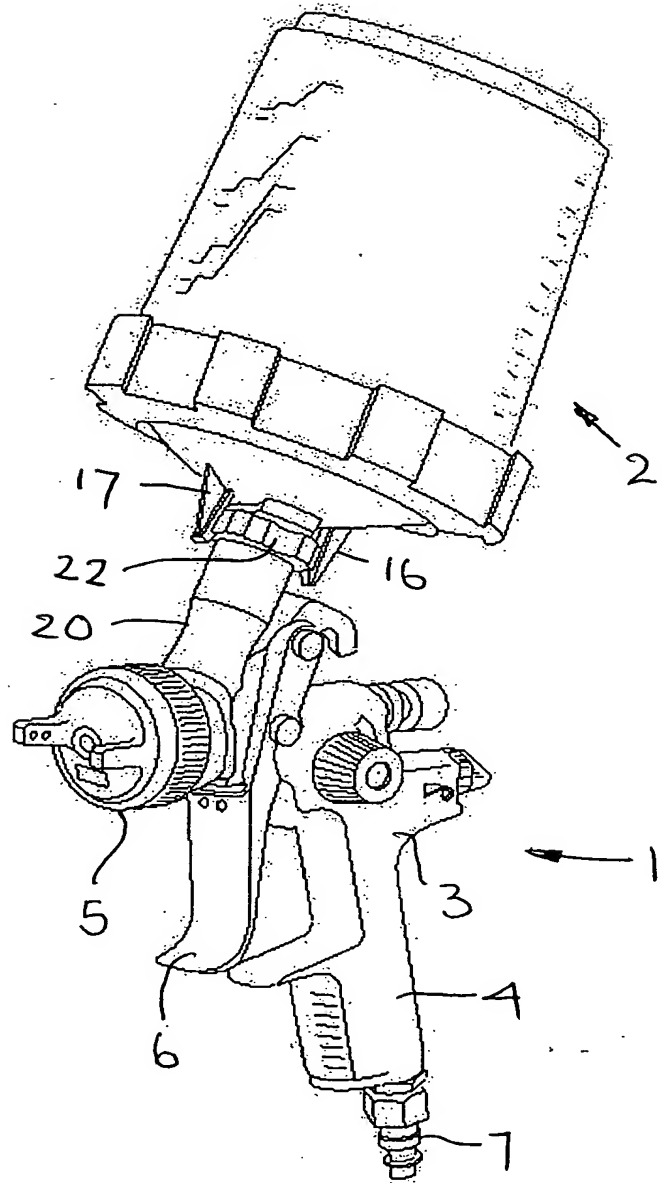


Fig. 1.

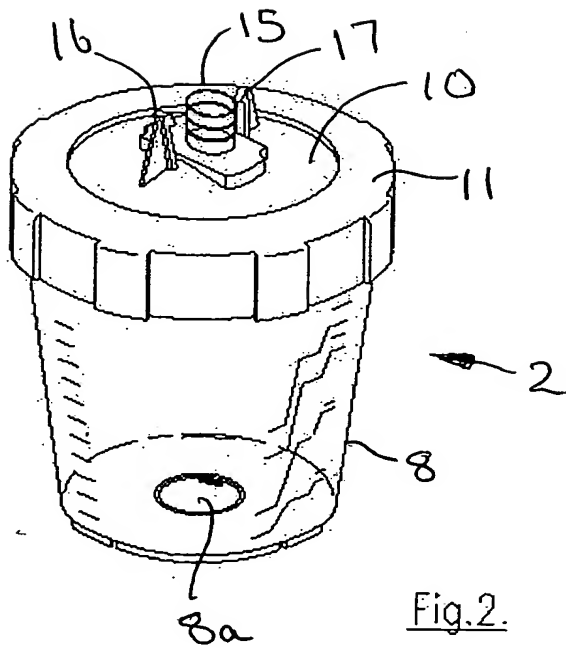
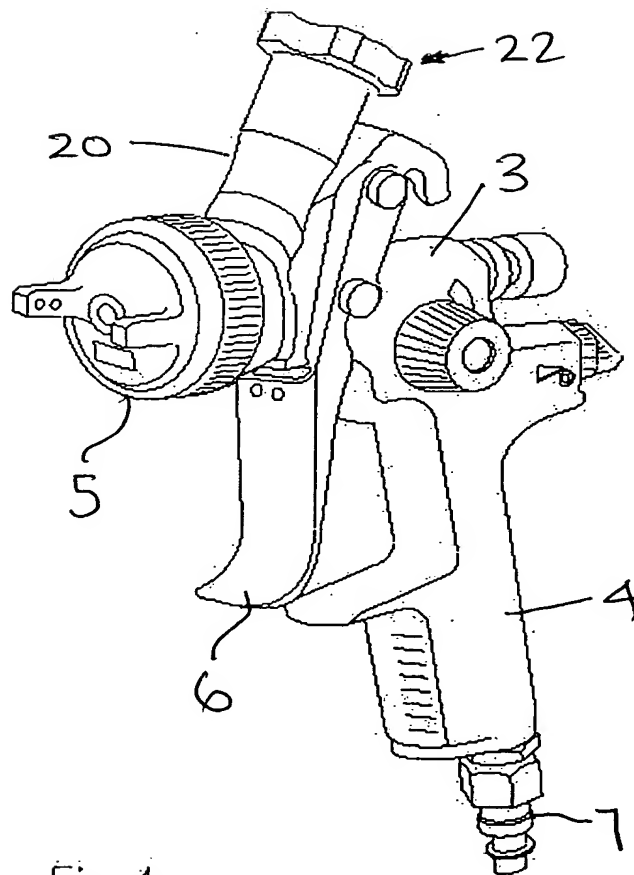
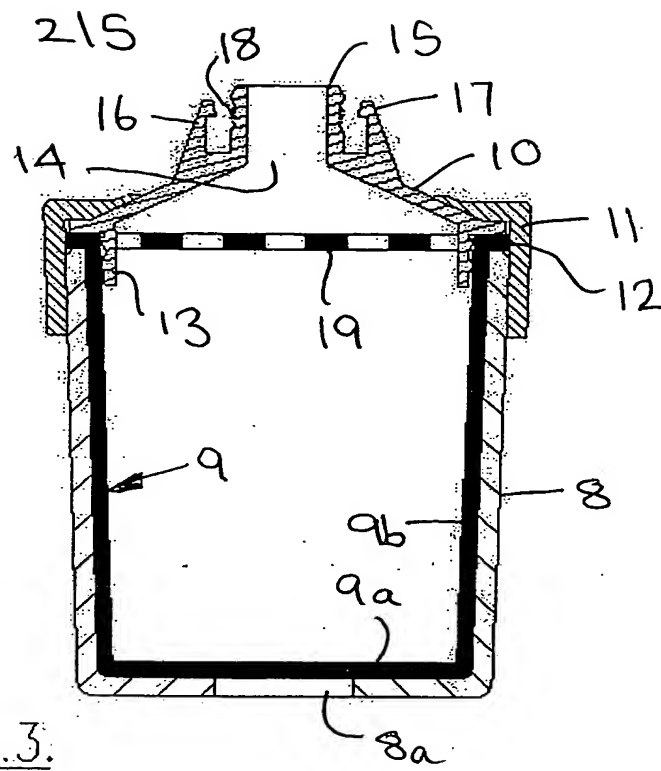
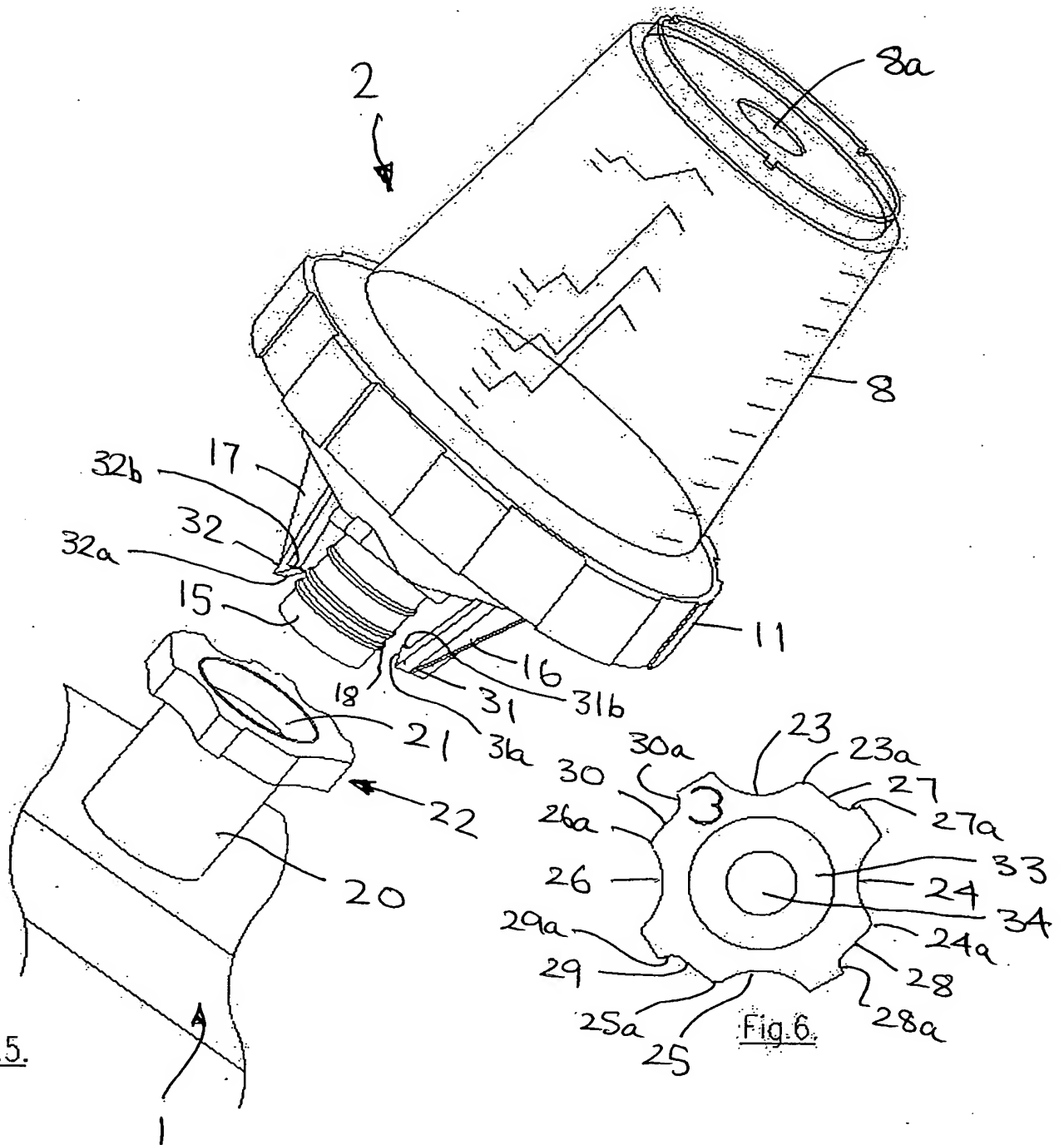


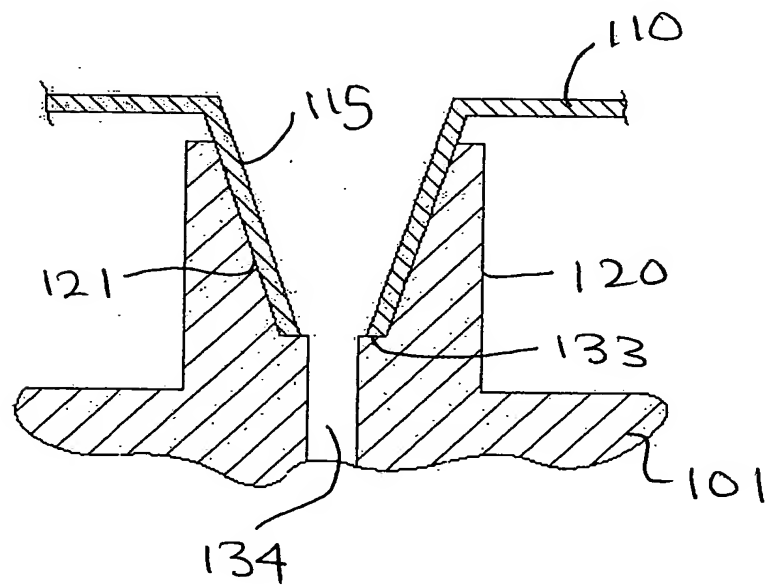
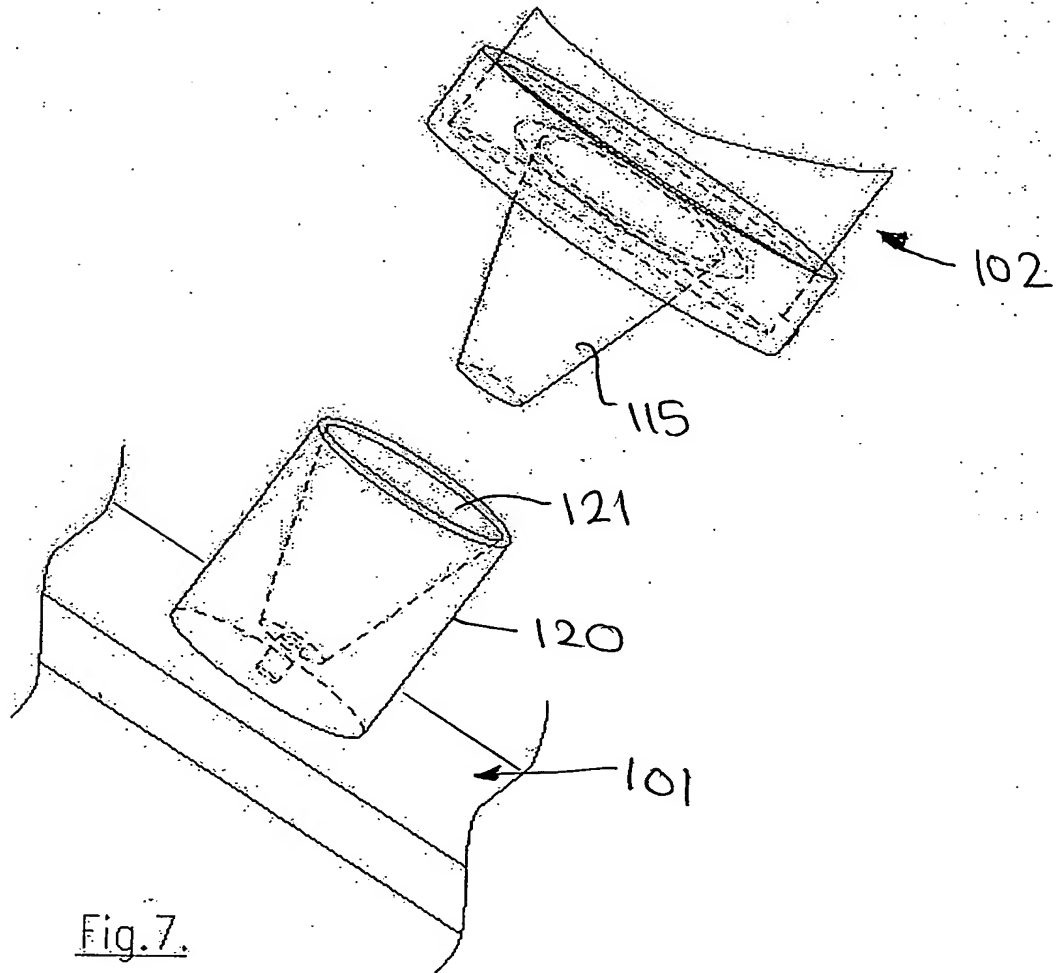
Fig. 2.



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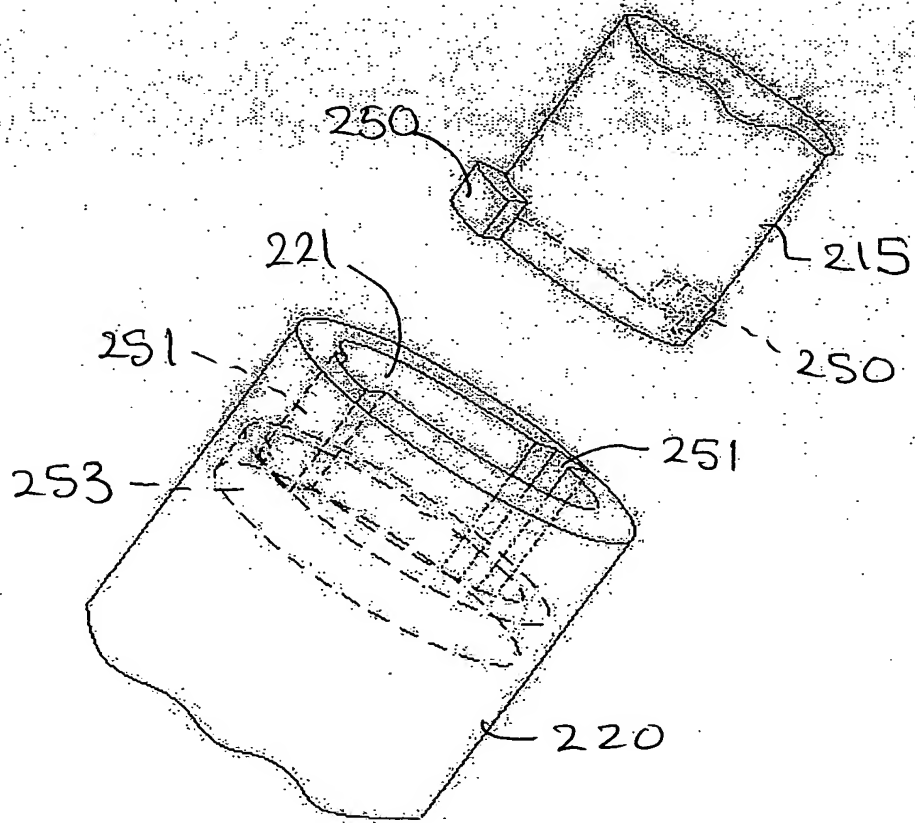


Fig. 9.

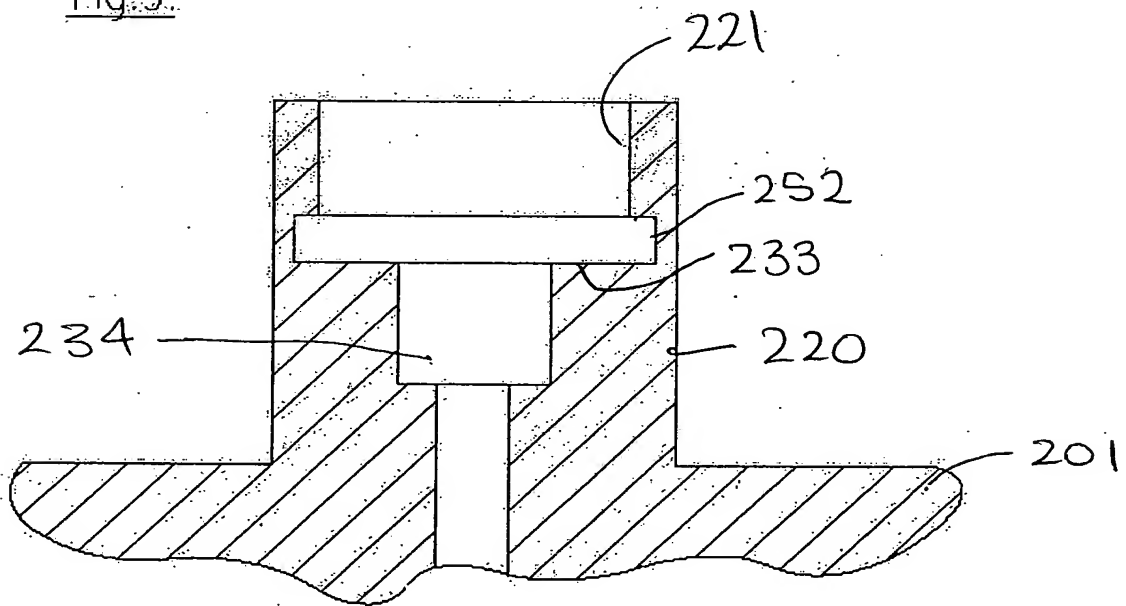


Fig. 10.

